

## CLAIMS

What is claimed is:

1. A method for providing continuous data protection, the method comprising the steps of:
  - duplicating writes made to a primary volume to a secondary volume in a sequential fashion; and
  - identifying a APIT time window wherein all writes are maintained so that within the identified time window, the primary volume may be restored to any previous point in time.
2. The method of claim 1 further including the step of mapping the writes between the primary volume and secondary volume
3. The method of claim 1 further including the steps of retaining particular points in time beyond the APIT window.
4. The method of claim 3 wherein a point-in-time map is created by creating a full mapping between the primary and secondary volumes for a point that is retained beyond the APIT window.
5. The method of claim 4 wherein the full mapping is created by merging mapping data structures ranging in time from time zero to the time the snapshot was taken.
6. The method of claim 4 wherein the full mapping is created by merging mapping data structures ranging in time from the time a point-in-time map created prior to the snapshot was taken to the time the snapshot was taken.

7. The method of claim 1 wherein data on the secondary volume that is outside of the identified time window is discarded.

8. The method of claim 1 wherein data on the secondary volume that is outside of the identified time window is phased out according to a retention policy.

9. The method of claim 4 further comprising the step of periodically creating point-in-time maps to reduce the amount of mapping structures that are needed when performing a restore.

10. A method for operating a data protection system for a protected computer system, the method comprising the steps of:

tracking writes made to a primary volume;

duplicating the writes in sequential fashion on a secondary volume;

organizing the mapping of the writes between the primary and secondary volumes into delta maps wherein the delta maps are structured to enable the primary volume to be rewound to any point in time; and

identifying a time window wherein data structures are maintained so that within the identified time window, the primary volume may be restored at any point in time.

11. The method of claim 10 wherein a snapshot is taken at a particular point in time within the identified time window and a full mapping of the primary and secondary volumes for the particular point time is created.

12. The method of claim 11 wherein the full mapping is created by merging delta maps ranging in time from time zero to the time the snapshot was taken.

13. The method of claim 11 wherein the full mapping is created by merging delta maps ranging in time from the time a point-in-time map created prior to the snapshot was taken to the time the snapshot was taken.

14. A system for providing continuous data protection, the system comprising:  
a host computer;  
a primary volume for storing data written by the host computer;  
a secondary volume wherein writes made to the primary volume are sequentially duplicated onto the secondary volume; and  
a data protection system configured to manage the duplication of writes to the secondary volume and map data between the primary and secondary volumes using delta maps wherein a time window is established wherein data structures are maintained so that within the established time window, the primary volume may be restored to any point in time.

15. The system of claim 14 wherein the data protection system is configured to create a point-in-time map for a point-in-time at which the primary volume needs to be restored.

16. The system of claim 15 wherein the point-in-time map is created by creating a full mapping between the primary and secondary volumes.

17. The system of claim 16 wherein the full mapping is created by merging mapping data structures ranging in time from time zero to the time the snapshot was taken.

18. The system of claim 16 wherein the full mapping is created by merging mapping data structures ranging in time from the time a point-in-time map created prior to the snapshot was taken to the time the snapshot was taken.

19. The system of claim 18 wherein the mapping data structure is a delta map.